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1 Introduction

A political science perspective on the Anthropocene

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Overview

Over the past decades, it has become more and more obvious that ongoing globalisation processes have substantial impacts on the natural environment. Studies reveal that intensified global economic relations have caused or accelerated dramatic changes in the Earth system, defined as the sum of our planet's interacting physical, chemical, biological and human processes (Schellnhuber et al. 2004). Climate change, biodiversity loss, disrupted biogeochemical cycles, and land degradation are often cited as emblematic problems of global environmental change (Rockström et al. 2009; Steffen et al. 2015). In this context, the term Anthropocene has lately received widespread attention and gained some prominence in the academic literature.

Although still controversial among different scholar groups, the term *Anthropocene* denotes a new geological epoch in the Earth's history in which humans have become the main drivers of change (Crutzen 2002). Human-induced climate change, species extinction, ocean acidification, plastic seas, desertification, overexploitation of natural resources, and other problems prompted by economic globalisation restrain and endanger the habitability of the planet. Governments at all levels and other political actors are now at a critical juncture to set sustainable development paths for the 21st century and beyond (Biermann et al. 2012). The key challenge is to alter the way we work, trade and do business on a global scale in order to reconcile our economies and ways of living with the natural basis of life on Earth. Thus, human societies must change direction and navigate away from critical tipping points in the Earth system.

The new geological epoch of the Anthropocene would follow the epoch of the Holocene after only ten thousand years. Several studies underscore that humans are driving or dramatically accelerating global environmental change which, in turn, is linked to the danger of an irreversible system transformation (Lewis and Maslin 2015). This hypothesis has kicked off a debate not only on the geoscientific definition of the Anthropocene era, but increasingly also in the social sciences. However, the specific contribution of the social sciences disciplines

and in particular that of political science still needs to be fully established. Against this backdrop, we address two fundamental questions in this edited volume:

- What is the contribution of political science to the Anthropocene debate, e.g., in terms of identified problems, answers and solutions?
- What are the conceptual and practical implications of the Anthropocene debate for the discipline of political science?

This introduction proceeds as follows: Next, we briefly refer to the origins and background of the Anthropocene concept and explain why it is a research object of political science. After that, we review the evolving political science literature on the Anthropocene and state what we think could be the key contribution of our discipline to the current debate on the human age. Then, inversely, we highlight the implications of the Anthropocene debate for political science. As such, the Anthropocene can be a linchpin in the debate that offers far-reaching opportunities to reflect upon the political and social dimensions of global environmental change. Finally, we outline the general structure of the edited volume and summarise the main arguments put forward by the authors of the individual chapters of this volume.

The Anthropocene as a research object of political science

The central idea of the Anthropocene is that humans are a new and influential natural force in the Earth system and hence became a 'geological factor'. This is considered a unique event in planetary history: "For the first time a single species dominates the entire surface, sits at the top of all terrestrial and oceanic food chains, and has taken much of the biosphere for its own purposes" (Langmuir and Broecker 2012, 597). At the same time, this characterises a fundamental change in the human-environment-relation, which now centres on human dominance over biological, chemical and geological processes on Earth. Paul Crutzen and Christian Schwägerl describe this relation as follows: "It's no longer us against 'Nature'. It's we who decide what nature is and what it will be" (Crutzen and Schwägerl 2011).

The hypothesis of the 'production' of nature draws attention to the political and social implications of the Anthropocene concept. The concept underlines the urgency to act in order to fight climate change, species extinction and other global problems. On the one hand, as impressively demonstrated in climate politics, political actors have struggled to agree on measures against anthropogenic climate change. Despite some progress in addressing the problem of climate change in the past few years, it is still very unclear whether global warming can be limited to 2° Celsius or even below compared to pre-industrial levels (Rockström et al. 2016). Indeed, the Paris Agreement stands for a far-reaching intergovernmental agreement, in which almost all countries on Earth committed themselves to individual steps to reduce or limit their national greenhouse gas emissions (Keohane and Oppenheimer 2016; Peters et al. 2017). However, the

United States lately announced their withdrawal from the Paris Agreement and, in other countries, the required ambition levels as well as concrete implementation programmes are lacking. In this context, we have to understand the Anthropocene as a threatening scenario and as a call for action.

On the other hand, the Anthropocene concept also changes the perspective regarding the 'controllability' of global environmental change. In this context, several authors highlight human stewardship to preserve the natural resources of Earth (Steffen et al. 2011). It is thus up to us how we design this human-dominated epoch and whether it will end in a catastrophe, or not. We can observe tendencies to simply accept conditions and causes of the Anthropocene as given, followed by suggestions how to deal with them. A further line of discussion deals with the options to transfer threatening systemic change into a stage of 'good Anthropocene'. Central to this perception is the idea that there already exist approaches how to positively influence the Anthropocene (Bennett et al. 2016). Others, by contrast, have criticised the Anthropocene outlook that humanity stands out from or above other species, and hence feeds further transformation of the Earth by humans (Manemann 2014). In both cases, the amenability of natural cycles by humans is taken as an opportunity or a justification to selectively interfere with ecological processes, with the claim to repair them (Vaughan and Lenton 2011). Visions of 'geo-engineering' and models of a planetary management of the Earth system, often based on hierarchical and authoritative visions of steering, have been put forward (Eckersley 2015). They are rooted in a firm belief in technological progress and the desirability of dominating nature – topics that have long been identified by political science scholarship.

Phantasies of dominating global environmental change stand in clear contrast to key findings of the Earth System Governance Project (e.g., Biermann 2014a). This line of research emphasises the complex and inherently political dimension of governance at all levels of the system and is hence opposed to simplified ideas of management and control. Central to this research are also local and transnational actors, such as various social movements on degrowth and alternative ways of living (for example, food sharing, car sharing, and other forms of a shared economy). The idea of controlling and managing global environmental change, quite the reverse, is top-down and primarily based on technocratic and expertocratic solutions. As a result, while the debate on the Anthropocene addresses questions that are inherently political, it apparently tends to depoliticise these societal aspects. From our perspective, the tension between politics and non- or post-politics characterises the new quality of the Anthropocene debate within the political science and more general within the social sciences.

The contribution of political science to the Anthropocene debate

According to some critical thinkers, we live in a 'post-political' age (Žižek 2004). From this perspective, the Anthropocene is not a neutral term describing an epochal transformation, as the natural sciences suggest, but the manifestation

of an epoch in which political debates are replaced by economic management and expert views. The debate on the Anthropocene gets firmly 'a-political' if Earth politics merely becomes a consensual question of 'good governance' instead of something for which it is worth arguing (Swyngedouw 2013, 2014). Bülent Diken and Carsten Laustsen contend that, under post-political conditions, "everything is politicized, can be discussed, but only in a non-committal way and as a non-conflict. Absolute and irreversible choices are kept away; politics becomes something one can do without making decisions that divide and separate" (Diken and Laustsen 2004, 15). While focusing on consensus, post-politics neglects differences among ideas and ideologies. It reduces the political terrain to a purely technical and administrative management of global climate and environmental problems. Critical voices hence see the Anthropocene as a justification of a new global technocracy, in which post-politics replaces conflictual disputes (Stirling 2014).

Moreover, universalism is a main characteristic to the debate. The concept of the Anthropocene refers to the whole of humanity. It is humanity that causes global environmental change, and thus should collectively carry the respective burdens. This perception neglects the fact that only a small percentage of humanity is responsible for the various ongoing adverse global environmental changes (Luke 2015). Human impact on the environment has always been unequal and variable over the course of time. Simon Lewis and Mark Maslin elaborate different options in their discussion on the Anthropocene (Lewis and Maslin 2015). The so-called 'Orbis hypothesis' denotes the beginning to the clash of the Anthropocene, colonialism and mercantilism. In contrast, the 'Great Acceleration' hypothesis depicts the beginning to the clash between the Anthropocene, post-war capitalism and the geopolitics of the Cold War. Others suggest the term Capitalocene (Bonneuil 2015; Moore 2016) to highlight the causal role of capitalism for irreversible environmental impacts and the emergence of the new epoch.

No matter which hypothesis one follows, it is crucial for the Anthropocene debate to reflect the societal circumstances and their meaning for the course of history. It is imperative to study the relations between the Anthropocene and capitalism, their parallels and common problems. The Anthropocene appears as a grand narrative of global systemic development, even though postcolonial and postfeminist approaches, for example, demonstrate such a claim to be untenable (Gibson-Graham 1996; Chakrabarty 2015; Caputi 2016; Grusin 2017). Despite differences in detail, all of these approaches emphasise the plurality of humanity, which clusters into classes, genders and generations. The definition and history of the Anthropocene would look different – representatives of these theories argue – if not only considered from a Eurocentric or techno-masculine perspective, on which the dominant narrative of the Anthropocene is based.

While humanity is not equally responsible for the causes, humanity does also not suffer equally from the consequences of environmental change. Global environmental changes affect in particular poor and marginalised people that are highly vulnerable and generally less resilient to rising sea levels, floods and draughts, crop losses, ongoing land degradation, and other adverse effects of ongoing global

environmental change, especially in the so-called Global South (Malm and Hornborg 2014). The idea of a general history of the Anthropocene stands on shaky ground, and it should be replaced by a plurality of – partial – narratives. This plurality would inevitably bring the political dimension back into the analysis and underline the great repertoire and enormous potential of a more pronounced political science perspective on the current Anthropocene debate.

The implications of the Anthropocene debate for political science

We do not understand the Anthropocene as a one-way street through which natural scientists diffuse their perception of the world in order to establish them in society, as it has sometimes been the case so far (for a critical note on this, see Castree et al. 2014; Lövbrand et al. 2015). The participation and the commitment of diverse disciplines are necessary for an informed discussion. From our perspective, simplified assumptions of Earth system *management* need to be replaced by more profound studies of governance and politics (including power-, interest- and knowledge-based approaches) in the Anthropocene (Biermann 2014b). Perceived as a political concept, the Anthropocene can be a linchpin that offers far-reaching opportunities to reflect upon the efficacy and the creative power of humanity. Despite an evolving political science literature, representatives of this discipline have only recently begun to attract wider attention in the Anthropocene debate (e.g., Hamilton et al. 2015; Lövbrand et al. 2015; Pattberg and Zelli 2016).

The core of the debate on the Anthropocene – we argue – is not about the new geological epoch, but rather about the political and social dimensions of global environmental change. We can approach these dimensions through using *theories and concepts*. In this regard, our understanding of human-nature relations is central. It is imperative to the Anthropocene debate to reconsider and redefine this relation, without falling back into old patterns of nature domination. Anthropogenic, hence not naturally given changes are not without alternatives; they are the consequence of political action. At the same time, humanity is a central part of the history of nature. In this vein, the Anthropocene points out the inescapability of politics. This inescapability includes the urgency which the 'non-political politics' (Swyngedouw 2013) of the Anthropocene concept discloses. In other words, the current debate is very much focused on the question of how humanity can adapt to the various environmental changes, whereas the actual political and societal causes of the changes are largely neglected.

Political scientists should more actively follow-up on this reflection and respective studies than they have done so far. It is not enough to only superficially point to the relevance of the discipline of political science, while the debate continues to be based on perceptions of the relation between technology or humans and nature back from the 1970s or earlier. Eva Lövbrand et al. come to a similar conclusion: "We believe that a deeper involvement of critical social science in global environmental change research represents an important step out of this post-political situation" (Lövbrand et al. 2015, 214). The repoliticisation of the

Anthropocene gives us the opportunity to discuss *governance and practices* from new ontological angles, and this discussion should fundamentally go beyond the pragmatic defence of the status quo (keyword: post-politics).

The main objective of political science research should be to identify a diversity of understandings, problem descriptions and future ideas about the design of environmental and sustainability politics in the Anthropocene. Thereby, spaces for *critical perspectives and implications* can be created. Such spaces would allow the Anthropocene to be not the 'end of politics' but the contrary: An epoch in which humans become genuinely environmentally aware and actively engage with the Earth system and the ecosystems they live in. These three areas of political science scholarship, (i) theories and concepts, (ii) governance and practices, and (iii) critical perspectives and implications, constitute the broad sections of this edited volume. In each of these parts, the authors seek to clarify the genuine contribution of political science to the Anthropocene debate as well as the implications of *Anthropocene thinking* for political science as a discipline and intellectual endeavour.

The implications of human-induced global system changes for political science research are diverse. As natural scientists dominate the debate on the Anthropocene, scholars have not sufficiently reflected upon these changes yet. In the following section, we take up major lines of discussion in the debate on the Anthropocene, around which the volume is organised. We aim to shed light on the political and social dimensions of the concept. As the social sciences have so far been involved rather superficially into the debate, these dimensions have not seriously been taken into consideration. In particular, we seek to understand the reasons of this blind spot. Therefore, we strive for more political science engagement to foster a broader and deeper debate on the Anthropocene between scholars from the natural sciences and the social sciences.

Structure of this volume

This edited volume offers a series of original analyses from the discipline of political science and contributes to the current Anthropocene debate in three respects: First, the book provides novel theoretical and conceptual accounts of the Anthropocene (*Part I: Theories and concepts*). These chapters address the question: What is the political dimension of the Anthropocene debate and how does the proclaimed human age change the foundations of existing theoretical and conceptual approaches? Second, the book examines contemporary politics as well as policy-making in the Anthropocene and lays out a political science research agenda for the field (*Part II: Governance and practices*). These chapters deal with the question: What are the political repercussions of the human age for individual policy domains, such as climate change, agriculture and security? Third, the book takes one step back and reflects upon the Anthropocene debate as such (*Part III: Critical perspectives and implications*). These chapters raise the question: What are the societal responsibilities in the human age and what do

they imply for our democratic political-administrative systems and for future generations?

Part I of the volume on 'theories and concepts' is opened with a contribution from Maike Weißpflug (chapter 2), who demonstrates that the Anthropocene debate can draw from a rich body of theories and concepts of political science. She proposes to rethink the Anthropocene with two key political science scholars, Hannah Arendt and Theodor W. Adorno. Both offer a critique of abstract 'grand' narratives and call for acknowledging the more complex, decentralised human-nature relations. The Anthropocene has been framed as a normative narrative from the very beginning, and Weißpflug analyses the 'grand' storytelling of the Anthropocene. As this is detached from everyday actions and real-world experiences, it becomes difficult to rethink our relation to and responsibility for the natural world. Acknowledging the complexity, diversity and local dimensions of how societies relate to nature opens up ways to redefine and reshape these relations and a shared responsibility towards humanity and the natural world we live in.

In chapter 3, Johannes Lundershausen evaluates the Anthropocene as a scientific description of the Earth system that is inherently linked to normative statements about past, present and future states of that system. In particular, the argument elaborates on the distinction between the Anthropocene depicted as a 'crisis' and 'opportunity' as two ways of understanding the history of humans on Earth. Lundershausen argues that opening up the different normative logics underpinning scientific representations helps scientists and others to understand the entanglement of scientific research on global change in ethical and political decision-making. Furthermore, the author clarifies the implications for responses to global change by elucidating how they invigorate existing proposals of Earth System Governance and geo-engineering, respectively.

In chapter 4, Basil Bornemann studies the consequences of the Anthropocene debate for concepts of governance, starting from the assumption that *Anthropocene thinking* has already entered politics and political science in recent years. The proclamation of the geological epoch challenges not only perceptions and practices of environmental and sustainability politics, but also the conceptual foundations of politics more generally. Bornemann argues that, from a political science perspective, understandings of governance in the Anthropocene debate are simplistic and under-complex. In particular, he criticises the linear and centralist perception of authority as well as the lack of a contextual view. However, Bornemann also sees potential in the Anthropocene debate to challenge, reflect upon and further innovate existing governance thinking in political science. The Anthropocene debate points to gaps and biases that call for a reconsideration of concepts and practices of governance. He highlights especially the need for a re-materialisation of politics and political theory, in form of an internalisation of nature in its conception construction.

In chapter 5, Franziska Müller analyses how the Anthropocene enters the field of International Relations (IR) as a rupture. This has significant repercussions for classical IR theory, in declaring a crisis of the liberal world order, acknowledging other species besides human agency and requesting new problem-solving

strategies. The call for a different understanding of 'the political' provides ontological and epistemological challenges for the discipline. Müller discusses strategies for transforming IR theories to conceptualise the Anthropocene challenge. An ongoing debate that evolved around the 'Manifesto for the end of IR' (Burke et al. 2016) serves as a reference point for identifying Holocene features within IR theories. This builds the ground for a more in-depth discussion regarding the Anthropocene's systemic, normative and governance implications for theory development and IR's research agenda. It refers especially to Holocene and Anthropocene conceptualisations of the international system, actors and agency beyond man and state, as well as modes of governance and problem-solving strategies.

Part II of the volume on 'governance and practices' starts off with the contribution of Judith Nora Hardt (chapter 6) on how the Anthropocene has entered one of the central sub-disciplines of International Relations and political science: security studies. Hardt critically contrasts the security conceptions of different worldviews of *Anthropocene thinking* (a dynamic interrelated human-nature world) and *Holocene thinking* (natural processes acting as a background for human action). She then scrutinises the contributions that the critical approaches to security studies have on the Anthropocene debate. As Hardt argues, there exist opportunities along the threat-response logic and the focus on central values and fears in relation to the Anthropocene discourse. Consequently, developing an *Anthropocene thinking* of security could advance a research agenda that focuses more explicitly on these fundamental questions for humankind.

In chapter 7, Lukas Hermwille emphasises that the very notion of the Anthropocene implies that we are already transforming the world, and we do so at the grandest imaginable scale. Building on theoretical perspectives of transition research, he argues that such transformations can be actively governed, although not in the sense of a universalist, control-type of style. He conceptualises global climate governance as a 'boundary object' to enable researchers from different disciplines to work together on this issue. In particular, Hermwille brings together concepts of landscape, regime and niche from socio-technical system analysis with multi-level governance approaches from the political science. He discusses their compatibility and implications for Anthropocene governance. While socio-technical system analysis finds transformations to start in niches, political science research still tends to assume that it is possible to govern the Anthropocene at a supranational or regime level.

In chapter 8, Chris Höhne further elaborates the issue of global climate governance with a focus on Indonesia. As an emerging economy, Indonesia is among the highest greenhouse gas emitters in the world. While Höhne highlights the crucial role of emerging economies in shaping the geological epoch of the Anthropocene, he finds that Indonesia has increasingly become aware of its responsibility in this field. For instance, Indonesia committed itself to Nationally Appropriate Mitigation Actions (NAMAs) as a result of the 2007 Conference of the Parties (COP) 13 in Bali. The contribution sheds light on how and why developments in the UNFCCC have triggered institutional and policy changes for

mitigating climate change in Indonesia. It builds upon an analysis of the Anthropocene debate in the International Relations literature, and applies a multi-level global governance framework to account for the dynamics between the global and the domestic governance of the Anthropocene. Höhne finds that, despite only 'talking the talk' without 'walking the walk', i.e., incorporation of climate rhetoric without practical consequences on the ground, the Indonesian government meanwhile shares the norms of climate mitigation.

In chapter 9, Sandra Schwindenhammer connects findings from (critical) constructivist International Relations research with recent theoretical works on environmental governance and politics in the Anthropocene. It conceives the Anthropocene as a social construction. This in turn requires more nuanced conceptions of agency, norms and technological innovations. The empirical focus of the chapter is on global agricultural production and governance. Schwindenhammer outlines a constructivist research agenda including three main dimensions for future research: The dimension of agency deals with the material and normative embeddedness of norm entrepreneurship in the Anthropocene and sheds light on who is conceived as an agent in charge of governing agricultural systems and why. The dimension of norms highlights the (conflictive) normative foundations and interpretations of societal problems in the agri-food system in the Anthropocene. The dimension of technological innovations discusses the rise of transformative technologies in light of normative debates about agricultural governance in the Anthropocene. Overall, the chapter highlights the important contributions of constructivist IR research to the Anthropocene debate.

Part III on 'critical perspectives and implications' begins with the contribution by Till Hermanns and Qirui Li (chapter 10) on sustainable land use in the Anthropocene. The authors present a framework for sustainability impact assessment (SIA), which is a tool to support political decision-making concerning sustainable human space usage. The debate on the Anthropocene calls for social science approaches for an integrative and spatially explicit SIA of land use changes. It influences scientific approaches to the SIA of land use changes due to increasing evidence that planetary boundaries are being exceeded by humankind and that societal value systems are changing. To correctly identify land use claims, Hermanns and Li argue, SIA approaches are required that include a representation of humankind as a major geological driver of land use changes. In future SIA research, anthropogenic land use claims and patterns should be linked with the boundaries of bio-geophysical thresholds of the Earth system. This will help to integrate the knowledge base on sustainability gains and deficits of land use changes when addressing issues of global governance.

In chapter 11, Dörte Themann and Achim Brunnengräber interpret the Anthropocene as expression of the interdependencies between a radically transformed nature, the man-made technosphere with its path dependencies and internal dynamics, and societies. Humans are both driving forces of the Anthropocene as well as they are affected by it. The authors use the handling of nuclear remnants and the final disposal of high-level radioactive waste as an example to demonstrate the changed relationship between nature, technology and society, which they interpret

as a characteristic of the Anthropocene. They argue that the technosphere challenges present and future generations with an increasing phenomenon called 'unknown unknowns', i.e., societies have to deal with incalculable timescales, path dependencies and increasing uncontrollability of the technosphere. This calls for novel governance concepts that comply better with the interrelations between nature, technology and society, capable of taking uncertainties and uncontrollable dynamics into account.

In chapter 12, Jens Marquardt critically addresses the universalism of the Anthropocene concept. In times of massive global environmental threats, proponents of the Anthropocene often call for a global transformation towards sustainability in all societies around the world. Marquardt challenges this universalism and asks how voices and ideas from the Global South contribute to the Anthropocene discourse. In a review of more than 1,200 journal articles from 2002 to 2016, the contributions from scholars from the Global South to the Anthropocene debate were analysed. Marquardt finds that the ideas, worldviews and concepts from the Global South are rarely recognised in the Anthropocene discourse despite the concept's global aspirations. To include these voices would allow for additional perspectives and critical reflections on the Anthropocene related to human-nature relations, power struggles and widespread technocentrism.

In chapter 13, Jörg Tremmel engages with the important question of implications that the proclamation of the Anthropocene should have for the pivotal concept of democracy. More particularly, Tremmel argues that the transition into a new geological phase also necessitates a further advancement of our form of government. Democracy, as it has been conceived of and been practiced until now, has to a large extent ignored the problem of 'presentism'. The contribution suggests an extension of the 300-year-old separation of powers between the legislative, executive and judicial branches. In order to make our political system more future-oriented, there is an urgent need for a new fourth branch that ensures that the interests of future generations are taken into account within today's decision-making processes. A newly established 'future council' could introduce respective legislation, integrating the competences of this new institution with those of the parliament.

In sum, the debate on the Anthropocene, which so far has largely been dominated by scholars from the natural sciences, needs to be opened up. Contributions from the discipline of political science have only recently started to attract the attention of authors concerned with the so-called human age. This edited volume joins the new wave of studies within the field of global environmental politics that explore the underlying social dynamics of the various ecological and geological changes in the Earth system, as well as their implications for governance and politics in the Anthropocene. The overarching goal of this book is to complement the Anthropocene debate with a well-grounded reflection on how the planetary scale crisis alters the ways in which humans respond to the most pressing environmental challenges in the 21st century. Our ambition is to establish political science as a central voice in the Anthropocene debate, without neglecting the important impulses and challenges that emerge from the Anthropocene debate for the

discipline of political science. In fact, the concept of the Anthropocene raises numerous questions with regard to environmental and development policy-making and provides a unique opportunity for re-thinking core concepts of the scholarship on global sustainability politics. The following chapters explore these intriguing questions in-depth.

References

Bennett, E.M., Solan, M., Biggs, R., McPhearson, T., Norström, A.V., Olsson, P., Pereira, L., Peterson, G.D., Raudsepp-Hearne, C. and Biermann, F. (2016) "Bright spots: Seeds of a good Anthropocene" *Frontiers in Ecology and the Environment*, 14(8), 441–448.

Biermann, F. (2014a) "The Anthropocene: A governance perspective" *The Anthropocene Review*, 1(1), 57–61.

Biermann, F. (2014b) *Earth System Governance: World Politics in the Anthropocene* MIT Press, Cambridge, MA.

Biermann, F., Abbott, K., Andresen, S., Backstrand, K., Bernstein, S., Betsill, M.M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P.M., Jordan, A., Kanie, N., Kluvankova-Oravska, T., Lebel, L., Liverman, D., Meadowcroft, J., Mitchell, R.B., Newell, P., Oberthur, S., Olsson, L., Pattberg, P., Sanchez-Rodriguez, R., Schroeder, H., Underdal, A., Vieira, S.C., Vogel, C., Young, O.R., Brock, A. and Zondervan, R. (2012) "Navigating the Anthropocene: Improving Earth system governance" *Science*, 335(6074), 1306–1307.

Bonneuil, C. (2015) "The geological turn: Narratives of the Anthropocene" in Hamilton, C., Bonneuil, C. and Gemenne, F. eds., *The Anthropocene and the Global Environmental Crisis* Routledge, London, 17–31.

Burke, A., Fishel, S., Mitchell, A., Dalby, S. and Levine, D.J. (2016) "Planet politics: A manifesto from the end of IR" *Millennium: Journal of International Studies*, 44(3), 499–523.

Caputi, J. (2016) "Mother earth meets the Anthropocene" in Godfrey, P. and Torres, D. eds., *Systemic Crisis of Global Climate Change: Intersections of Race, Class and Gender* Routledge, New York, 20–33.

Castree, N., Adams, W.M., Barry, J., Brockington, D., Büscher, B., Corbera, E., Demeritt, D., Duffy, R., Felt, U. and Neves, K. (2014) "Changing the intellectual climate" *Nature Climate Change*, 4(9), 763–768.

Chakrabarty, D. (2015) "The Anthropocene and the convergence of histories" in Hamilton, C., Christophe, B. and Gemenne, F. eds., *The Anthropocene and the Global Environmental Crisis* Routledge, London, 44–56.

Crutzen, P.J. (2002) "Geology of mankind" *Nature*, 415(6867), 23.

Crutzen, P.J. and Schwägerl, C. (2011) *Living in the Anthropocene: Toward a New Global Ethos: Yale Environment 360* (http://e360.yale.edu/feature/living_in_the_anthropocene_toward_a_new_global_ethos/2363) Accessed 3 April 2017.

Diken, B. and Laustsen, C.B. (2004) *7/11, 9/11, and Post-Politics* (www.comp.lancs.ac.uk/sociology/papers/diken-laustsen-7-11-9-11-post-politics.pdf) Accessed 31 October 2017.

Eckersley, R. (2015) *Anthropocene Raises Risks of Earth without Democracy and without Us* (https://theconversation.com/anthropocene-raises-risks-of-earth-without-democracy-and-without-us-38911U) Accessed 31 March, 2017.

Gibson-Graham, J.K. (1996) *The End of Capitalism (As We Knew It): A Feminist Critique of Political Economy* Blackwell, Oxford.

Grusin, R. (2017) *Anthropocene Feminism* University of Minnesota Press, Minneapolis.
Hamilton, C., Gemenne, F. and Bonneuil, C. eds. (2015) *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch* Routledge, London.
Keohane, R.O. and Oppenheimer, M. (2016) "Paris: Beyond the climate dead end through pledge and review?" *Politics and Governance*, 4(3), 142–151.
Langmuir, C.H. and Broecker, W. (2012) *How to Build a Habitable Planet: The Story of Earth from the Big Bang to Humankind* Princeton University Press, Princeton, NJ.
Lewis, S.L. and Maslin, M.A. (2015) "Defining the Anthropocene" *Nature*, 519, 171–180.
Lövbrand, E., Beck, S., Chilvers, J., Forsyth, T., Hedrén, J., Hulme, M., Lidskog, R. and Vasileiadou, E. (2015) "Who speaks for the future of earth? How critical social science can extend the conversation on the Anthropocene" *Global Environmental Change*, 32, 211–218.
Luke, T. (2015) "Introduction: Political critiques of the Anthropocene" *Telos*, 172, 3–14.
Malm, A. and Hornborg, A. (2014) "The geology of mankind? A critique of the Anthropocene narrative" *The Anthropocene Review*, 1(1), 62–69.
Manemann, J. (2014) *Kritik des Anthropozäns: Plädoyer für eine neue Humanökologie* Transcript Verlag, Bielefeld.
Moore, J.W. (2016) *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism* Verso, Oakland.
Pattberg, P. and Zelli, F. (2016) *Environmental Politics and Governance in the Anthropocene: Institutions and Legitimacy in a Complex World* Routledge, London.
Peters, G.P., Andrew, R.M., Canadell, J.G., Fuss, S., Jackson, R.B., Korsbakken, J.I. and Nakicenovic, N. (2017) "Key indicators to track current progress and future ambition of the Paris agreement" *Nature Climate Change*, 7(2), 118–122.
Rockström, J., Schellnhuber, H.J., Hoskins, B., Ramanathan, V., Schlosser, P., Brasseur, G.P., Gaffney, O., Nobre, C., Meinshausen, M. and Rogelj, J. (2016) "The world's biggest gamble" *Earth's Future*, 4(10), 465–470.
Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F.S., Lambin, E.F., Lenton, T.M., Scheffer, M., Folke, C. and Schellnhuber, H.J. (2009) "A safe operating space for humanity" *Nature*, 461(7263), 472–475.
Schellnhuber, H.J., Crutzen, P.J., Clark, W.C., Claussen, M. and Held, H. eds. (2004) *Earth System Analysis for Sustainability* MIT Press, Cambridge, MA.
Steffen, W., Persson, Å., Deutsch, L., Zalasiewicz, J., Williams, M., Richardson, K., Crumley, C., Crutzen, P., Folke, C. and Gordon, L. (2011) "The Anthropocene: From global change to planetary stewardship" *AMBIO: A Journal of the Human Environment*, 40(7), 739–761.
Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W. and de Wit, C.A. (2015) "Planetary boundaries: Guiding human development on a changing planet" *Science*, 347(6223), 1259855.
Stirling, A. (2014) *Emancipating Transformations: From Controlling 'the Transition' to Culturing Plural Radical Progress* University of Sussex, Sussex.
Swyngedouw, E. (2013) "The non-political politics of climate change" *ACME: An International E-Journal for Critical Geographies*, 12(1), 1–8.
Swyngedouw, E. (2014) "Anthropocenic politicization: From the politics of the environment to politicizing environments" in Bradley, K. and Hedrén, J. eds., *Green Utopianism: Perspectives, Politics, and Micro-Practices* Routledge, London, 24–37.
Vaughan, N.E. and Lenton, T.M. (2011) "A review of climate geoengineering proposals" *Climatic Change*, 109(3–4), 745–790.
Žižek, S. (2004) "Afterword: The lesson of Rancière" in Rancière, J. ed., *The Politics of Aesthetics: The Distribution of the Sensible* Continuum, London, 69–79.